Garment allergy caused by disperse blue 360: a new sensitizer.

Running head: TEXTILE DYE CONTACT DERMATITIS FROM DISPERSE BLUE 360

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Disperse dyes belong to the most common causes of textile contact dermatitis. Current legislation does not help to identify the colorant used in a garment.

Case report:

A 34-year-old atopic female complained of itching and erythema on the contact sites of her new multicolored bikini and black and white dress. Symptoms had started a few hours after she wore the garments for the first time. The dress was composed 95% of polyester and 5% of elastane. Hitherto, the patient tolerated other black garments, black tattoos or hair dyeing.

Patch testing was performed according to ICDRG criteria with the Spanish Contact Dermatitis Research Group baseline series (using the TRUE Test®, AllergEaze®) extended with textile and rubbers series (both from Chemothecnique, Vellinge, Sweden). The readings showed extreme positive reactions (+++) to disperse dyes (Disperse Yellow 3, Disperse Red 17 and Disperse Blue 3, 153, 106, 124 and 21); *p*-phenylenediamine did not cause a test reaction. Patch tests with pieces of clothing also caused positive reactions. Determination of arylamines and disperse dyes with known sensitizing potency by mass spectrometry of both garments, with a detection limit of

1mg/kg failed to detect any substance. However, some of these dyes had shown reactivity in the patch test.

Due to the apparent discrepancy between positive patch test results with several dyes and lacking evidence of the presence of dyes by mass spectrometry, thin layer chromatography (TLC) from both textile extract was performed in the organic chemistry research center (CiQUS center of University of Santiago de Compostela). Two disperse dyes were found by TLC analysis: Disperse Blue 360 (DB360) and Disperse Orange 3 (DO3).

Subsequently, specific patches of DB360 and DO3 composed of different concentrations of both dyes, together or separately, applied on 1 cm^2 of polyester and polyester/elastane tissue were performed and employed in a semi-open test. Exposure time was 2 days and readings were made on D2, D4 and D7, showing strong positive reaction (+++) to DB360, both on polyester and polyester/elastane, and no response to DO3. Moreover, five volunteers were tested to DB360 without response, excluding an irritative reaction.

Discussion:

DB360 (N, N-diethyl-3-methyl-4-[2-(5-nitro-2-thiazolyl) diazenyl]-benzenamine; CAS no. 70693-64-0) is an azo dye not included in specific textile patch test series, possibly due to a lack of previous reports of contact dermatitis from this colorant and the impossibility of acquiring the purified dye. However, DB360 can also be found as a part of a mixture of azo and anthraquinone dyes used for inkjet printing (1).

Molecular structure similarity of DB360 ($C_{14}H_{17}N_5O_2S$) and DB106 ($C_{14}H_{17}N_5O_3S$) suggests cross-reactivity between both dyes, including the possibility that DB360 is as potent a sensitizer as its analogue, DB106 (1, 2). Textile dyes and their possible contaminants are unidentified given the current legislation and textile globalization. Cross-reactions, co-sensitization or impurities could cause multiple reactions at patch testing. Consequently, recognition of the responsible allergen dye can be difficult and performing a patch test with a garment 'as is' and analysis by TLC can be helpful. (3, 4).

In conclusion, we report a patient with allergic contact dermatitis to Disperse Blue 360, a dye not included in currently used specific test series.

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